Section 3. Atlantic Croaker and Spot

Introduction

Atlantic croaker (*Micropogonias undulates*) and spot (*Leiostomus xanthurus*) are very popular recreational fish along the Atlantic coast and throughout the Chesapeake Bay. Over the last 20 years, the recreational catch of croaker along the Atlantic coast has increased from 2 million pounds to 13 million pounds. Adults of both species migrate into the Bay during the spring months and out of the Bay in the fall. Juvenile fish utilize estuarine areas and live throughout the lower salinity regions of the Bay and its tributaries. Both spot and Atlantic croaker are bottom-dwelling fish that feed primarily on benthic organisms. They are important forage species for top predators like striped bass and bluefish.

Chesapeake Bay FMP

Because of an increase in commercial and recreational fishing pressure, the Chesapeake Bay Program adopted a fishery management plan (FMP) for croaker and spot in 1991.The goal of the plan is: to protect the Atlantic croaker and spot resource in the Chesapeake Bay, its tributaries, and coastal waters, while providing the greatest long term ecological, economic, and social benefits from their usage over time. To accomplish this goal, management strategies were developed to address the harvest of small fish and to recommend monitoring and research programs. The CBP plan followed the ASMFC recommendations. Since the major problem was perceived to be the harvest of small fish by the offshore shrimp trawl fishery, the Bay jurisdictions supported the use of bycatch reduction devices (BRDs). A synopsis of the management strategies and actions can be found in Table 3.1.

Atlantic Coast FMP

The Atlantic States Marine Fisheries Commission (ASMFC) adopted FMPs in 1987 for each species. The management measures at that time were not very specific and did not have any compliance requirements. The main purpose of the plans was to decrease the number of small fish caught as bycatch in the coastal shrimp trawl fishery. Bycatch reduction devices were required and successfully reduced the number of small fish caught in the trawl fishery.

<u>Spot</u>

In 1993, ASMFC recognized that the coastal spot FMP did not contain specific management requirements and that the status of the stock needed to be reevaluated. The South Atlantic Fishery Management Council (SAFMC) acknowledged the need for an amendment to provide for adaptive management. However, no plan development team has been appointed to date. There is no coastal stock assessment for spot and there is a lack of biological and fisheries data necessary for a stock assessment.

Atlantic croaker

Over the past 20 years, the recreational catch of croaker along the Atlantic coast has risen from 2 million pounds to 13 million pounds. The increasing harvest precipitated a renewed interest in determining more specific management recommendations. Before management recommendations could be developed, a stock assessment evaluating the status of the stock was necessary. An assessment was developed between 2003 and 2004 and used to develop Amendment I to the coastal Atlantic croaker FMP. Amendment I states the goal of the plan is "to perpetuate the self-sustainable Atlantic croaker resource throughout its range, and generate the greatest economic and social benefits from its commercial and recreational harvest and utilization over time." Biological reference points (BRPs) such as fishing mortality (F) and spawning stock biomass (SSB) were developed to guide management decisions. The amendment also provides the framework for adaptive management should stocks decline and was adopted in November 2005 (ASMFC 2005).

Stock Status

The coastal stock assessment for croaker indicates that abundance is high and fishing mortality is low in the mid-Atlantic region. Overfishing is not occurring. Fishing rates were the highest in the 1970s. It appears that the use of BRDs has been successful at reducing mortality on age 1 and younger fish. This has contributed to relatively stable fishing mortality and spawning stock biomass since the mid 1990s. Recent estimates of spawning stock biomass were 201 million pounds for the coast. The target F is 0.29 and recent estimates of F is 0.11, well below the target (ASFMC 2004a). Currently, there is not enough data to assess the status of croaker in the South Atlantic (South Carolina to Florida).

There is a lack of biological and fisheries data for spot along the Atlantic Coast. Consequently, no stock assessment has been conducted. Although there is no major spot survey, they are caught in state trawl and seine surveys and some biological data is available ASMFC 2004b).

Maryland collects spot and Atlantic croaker in the Estuarine Juvenile Finfish Survey (EJFS), Blue Crab Survey (BCS) and the finfish monitoring project in Maryland's coastal bays. Virginia collects spot and Atlantic croaker in the Virginia Chesapeake Bay Trawl Survey (VTS) and Striped Bass Seine Survey. Virginia's data is presented with age classifications (Virginia Institute of Marine Science, 2005)**;** Maryland's data is not broken down by age.

Spot

The state surveys provide an indication of spot abundance. Maryland and Virginia surveys indicate long-term trends of decreased abundance for spot (Mowrer 2004; Durell and Weedon, 2004; VIMS 2005). Maryland coastal bays monitoring project showed a spot index that has been variable over the 31-year sampling period, but recent levels have been consistently low (Casey et al. 2002). Maryland biologists also sampled spot from

commercial pound nets in the lower bay and found a gradual increase in mean lengths since the low in 2002 (Sadzinski et al 2005). Mean length in 2004 was 208mm.

Atlantic croaker

In Maryland, juvenile Atlantic croaker are primarily caught in the BCS and results from 2004 show a continued increasing trend (Mowrer 2005). Results from the EJFS and VTS have been highly. Trawls in Maryland's coastal bays found an above average abundance of juvenile Atlantic croaker (Casey et al 2002). Data from Maryland's Chesapeake Bay pound net survey show an increase in mean length from 287mm to 311mm. Pound net survey data calculations reveal a total instantaneous mortality (Z) of 0.28 (Sadzinski et al 2005). The coastal stock assessment relied heavily on data from the mid-Atlantic, because this is the core of the population

Fishery Statistics

Spot

Spot is an important recreational and commercial species. Spot are harvested from gill nets and haul seines, but most of the catch is from pound nets. The largest catches occur in the fall, as spot are migrating out of the Bay and are landed as bycatch in pound nets. Because spot are a short-lived species, most harvest in a year is made up of a single year-class. Maryland's catch is only a small portion of the Chesapeake landings, most of which is caught in Virginia (Figure 3.1).While total commercial landings are variable from year to year, the total catch in Maryland and Virginia has averaged 3.7 million pounds since 1994. In the mid-1980s, total catch for both states was 1.8 million pounds. There are no regulations for the commercial spot fishery.

Spot are one of the most frequently caught species by recreational fishermen. While there appears to be a downward trend in number of spot landed in the Chesapeake region, there are often more spot landed in the recreational fishery than for the commercial fishery (Figure 3.2). Currently, there are no regulations for the recreational spot fishery.

Atlantic croaker

The Chesapeake Bay was once responsible for the majority of the commercial Atlantic coastal landings. Pound nets are the primary gear used to fish for Atlantic croaker. There was a decline in harvest through the 1940s to the 1980s, when landings were near 2 million pounds. In the mid to late 1990s commercial landings began to increase, and this trend has continued through 2004. Maryland commercial landings have averaged 1.5 million pounds over the last three years while Virginia has averaged approximately 11.0 million pounds (Figure 3.3). With the adoption of the CB FMP in 1991, a 9-inch minimum size limit was implemented. In recent years, the fishery has been closed seasonally, usually January through mid-March.

Atlantic croaker are a significant recreational fish in Maryland. It is usually within the top ten species caught in the Bay. There appears to be an increase in estimated recreational landings of Atlantic croaker in Virginia, while landings in Maryland appear to have slightly decreased (Figure 3.4). Recreational fishermen are restricted to a 9-inch

size minimum size limit and are allowed 25 fish per person per day. The recreational fishery is open year-round.

Emerging issues

Both of these species play an important role in the Chesapeake Bay ecosystem. They feed primarily on benthic organisms and regulate these communities through predation. Spot and Atlantic croaker are also important forage fish for species such as bluefish, striped bass, weakfish, flounder, and other predators. The development of an ecosystem-based fishery management plan for striped bass is currently in progress and will include predator-prey interactions.

Spot

ASMFC has acknowledged that the current coastal FMP for spot does not provide management guidelines based on biological reference points (BRP) such as fishing mortality (F) or spawning stock biomass (SSB). A formal stock assessment needs to be conducted in order to characterize the current status of the stock. As part of the stock assessment, there should be further investigations into the bycatch of juvenile spot in the commercial trawl fishery. Once this is complete, an amendment to the coastal FMP can be developed that allows for management changes based on BRPs.

Atlantic croaker

Based on the coastal stock assessment, an amendment to the coastal FMP for Atlantic croaker was completed. ASMFC recommends that bycatch data be closely monitored, and bycatch reduction devices continue to be promoted for use in the southern shrimp fishery.

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Virginia Institute of Marine Science. 2005. Juvenile Fish and Blue Crab Trawl Survey. http://www.fisheries.vims.edu.

Figure 3.1. Commercial Landings of Spot from the Chesapeake Bay (Source: NMFS)

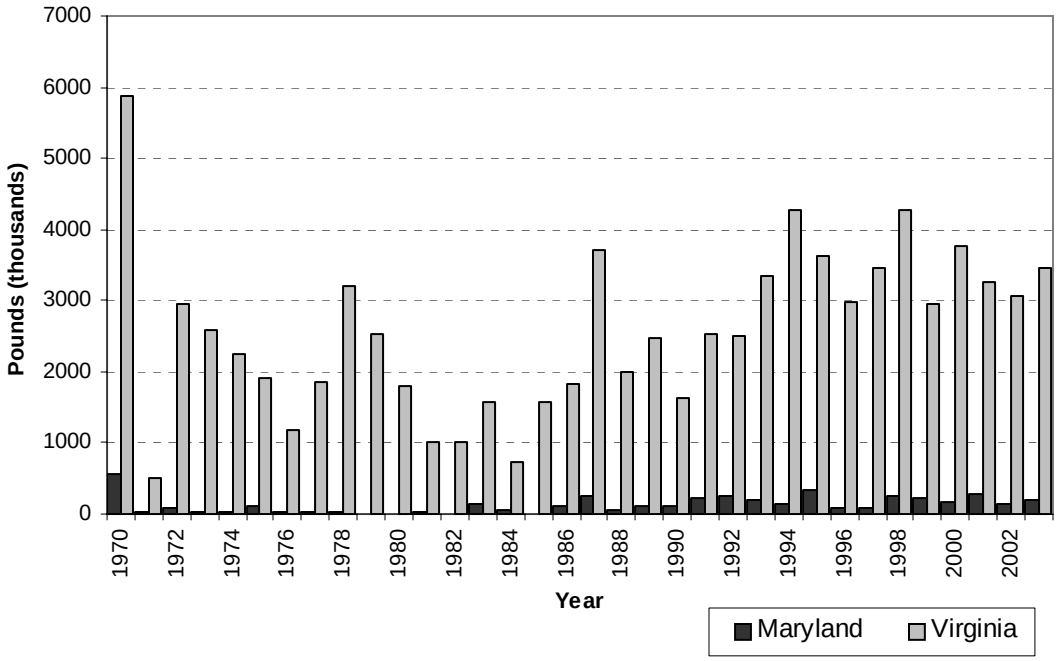

Figure 3.2. Estimated Recreational Landings of Spot from the Chesapeake Bay (Source: MRFSS)

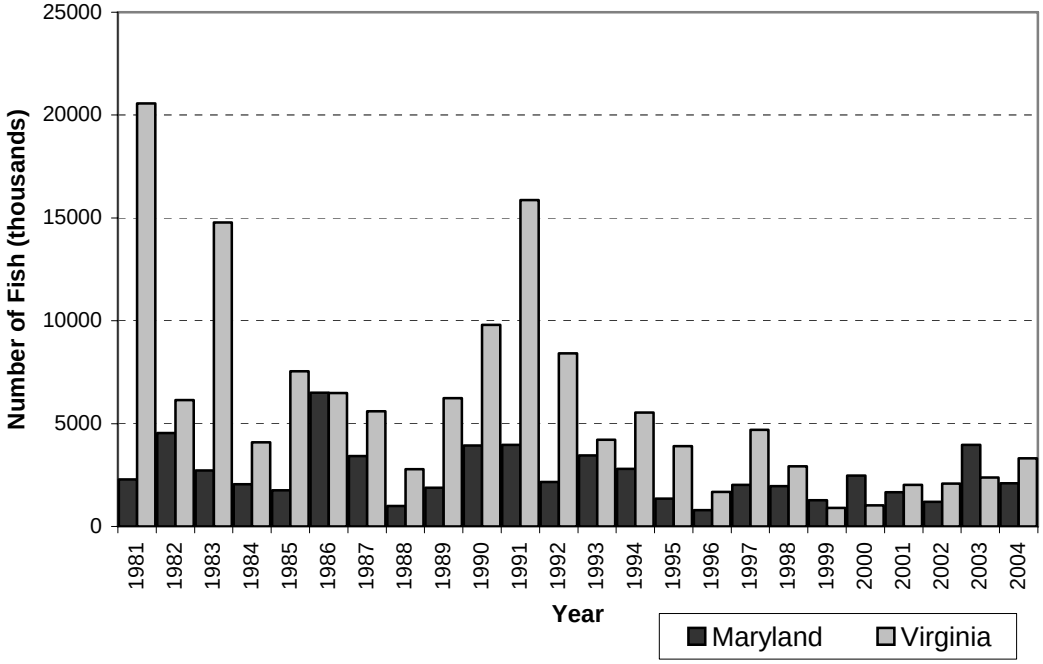

Figure 3.3. Commercial Landings of Atlantic Croaker from the Chesapeake Bay (Source: NMFS)

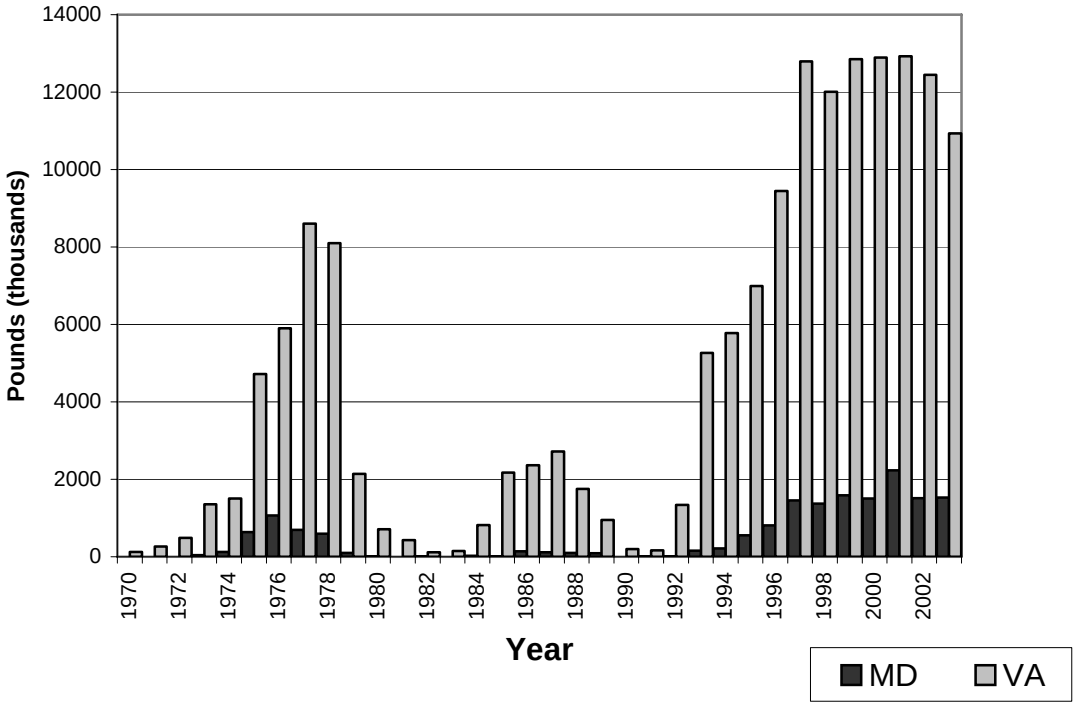

Figure 3.4. Estimated Recreational Landings of Atlantic Croaker from the Chesapeake Bay (Source: MRFSS)

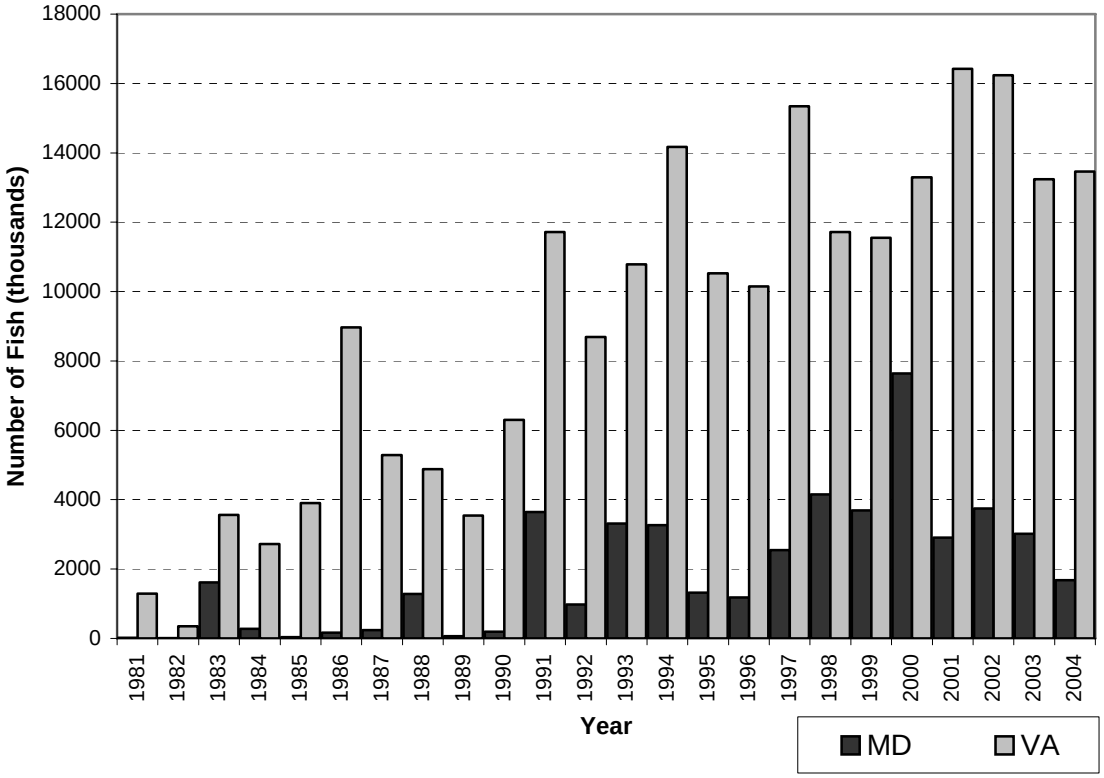

Table 3.1 1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation (10/05)

Problem Area	Action	Date	Comments
Stock Status Annual abundance of Atlantic croaker and spot is highly variable from year-to-year	Action 1.1 CBP jurisdictions will continue to participate in scientific and technical meetings for managing Atlantic croaker and spot along the Atlantic coast and in estuarine waters.	Continue	CBP jurisdictions will continue to monitor Atlantic croaker and spot stocks and cooperate with the ASMFC to mange stocks through inter-jurisdictional management measures. BRPs have been adopted for the coastal croaker stock. Current estimates of F and SSB indicate that the croaker stock is healthy and overfishing is not occurring.
Little information is available on the causes of stock fluctuations.	Action 1.2.1 A) MD and the PRFC have a minimum size limit for Atlantic croaker. B) VA does not have a minimum size limit for Atlantic croaker.	Continue 1993	CBP jurisdictions will promote the increase in yield per recruit for the Atlantic Croaker and spot fisheries. MD & PRFC also have a 25 fish/person/day creel limit for croaker.
	Action 1.2.2 CBP jurisdictions will evaluate the need to implement a minimum size limit for spot.	1992	No recommendations have been made.
Harvest of Small Croaker and Spot Incidental bycatch and discard mortality of small croaker and spot in non-directed fisheries is substantial and has the potential to significantly impact croaker and spot stocks.	Action 2.1 A) Through the ASMFC, the jurisdictions will promote the development and use of trawl efficiency devices (TEDs) in the southern shrimp fishery and promote the use bycatch reduction devices (BRDs) in the finfish trawl fishery. B) Virginia will continue its prohibition on trawling in state waters. Virginia will maintain its $2^{7}/_{8}$ inch minimum mesh size for gill nets C) Maryland will continue its 4-6 inch gill net restriction during June 15 through September 30 and implement a 3 inch minimum mesh size along the coast. D) PRFC will continue its prohibition on gill net fishing in the summer.	Continue Continue 1992 Continue	Commercial trawling is prohibited within the Chesapeake Bay. The 2004 Croaker Stock Assessment indicates that the coastal states have been successful at reducing mortality on age 1 fish.
	Action 2.1.2 CBP jurisdictions will investigate the magnitude of the bycatch problem and consider implementing bycatch restrictions for the non-directed fisheries in the Bay	1992 On-going	CBP jurisdictions are evaluating the effectiveness of bycatch reduction panels in poundnets. Some coastal states are using panels to reduce bycatch of small fish.

Table 3.1 1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation (10/05)

Problem Area	Action	Date	Comments
Research and Monitoring Needs There is a lack of stock assessment data for both Atlantic croaker and spot stocks in the Chesapeake Bay.	Action 3.1 VMRC stock assessment program will continue to analyze size and sex data from Atlantic croaker and spot collected from the VA commercial fishery.	Continue	The amount of data available for croaker has changed and provided the basis for the 2003/2004 coastal stock assessment. Stock assessment data for Atlantic croaker and spot is collected from the MD Juvenile Striped Bass Survey, and VIMS Juvenile Abundance Surveys (formerly known as the VIMS Trawl Survey and the VIMS Juvenile Seine Survey).
	Action 3.2 A) MD and PRFC will encourage research to collect data on croaker and spot biology, especially estimates of population abundance, recruitment, and reproductive biology. B) VA will continue to fund its stock assessment research conducted by the conducted by VIMS and ODU, specifically designed to provide the estimates of population abundance, recruitment, and reproductive biology.	Continue Continue	Data from the ChesMMAP and the CHESFIMS will be used to delineate species interactions and predator/prey relationships. Results can then be incorporated into management strategies in the CBP Atlantic Croaker and Spot FMP. The data will also be used in the new ecosystem based FMPs especially for striped bass.

Table 3.1 1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation (10/05)

Problem Area	Action	Date	Comments
Habitat and Water Quality Issues Habitat alteration and water quality impact the distribution of finfish species in the Chesapeake Bay	Action 4.1 CBP jurisdictions will continue to set specific objectives for water quality goals and review management programs established under the 1987 Chesapeake Bay Agreement. The Agreement and documents developed pursuant to the Agreement call for: A) Developing habitat requirements and water quality goals for various finfish species. B) Developing and adopting basinwide nutrient reduction strategies. C) Developing and Adopting basinwide plans for the reduction and control of toxic substances. D) Developing and adopting basinwide management measures for conventional pollutants entering the Bay from point source and non-point sources. E) Quantifying the impacts and identifying the sources of atmospheric inputs on the Bay system. F) Developing management strategies to protect and restore wetlands and submerged aquatic vegetation (SAV). G) Managing population growth to minimize adverse impacts to the Bay environment	Continue 2000	CBP jurisdictions support the commitments of the Chesapeake Bay 2000 Agreement. These activities include the discharge of toxic pollutants or excessive nutrients into the Chesapeake Bay and its tributaries, interruption or changes in water discharge patterns, deposition of solid waste, sewage sludge or industrial waste into the Bay (which may lead to anoxic conditions), rapid coastal development, unregulated agricultural practices, net coastal wetland loss or the dredging of contaminated sub-aqueous soils.

Abbreviations

ASMFC = Atlantic States Marine Fisheries Commission; CHESFIMS = Chesapeake Bay Fishery Independent Multispecies Fisheries Survey
ChesMMAP = Chesapeake Bay Multispecies Monitoring and Assessment Program; CBP = Chesapeake Bay Program
FMP = Fishery Management Plan; ODU = Old Dominion University; PRFC = Potomac River Fisheries Commission
VIMS = Virginia Institute of Marine Science